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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/250,400	02/16/1999	MASATAKA YAMASHITA	35.C13319	2017

5514 7590 07/17/2003

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EXAMINER

RAMSEY, KENNETH J

ART UNIT	PAPER NUMBER
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2879

DATE MAILED: 07/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/250,400

Applicant(s)

YAMASHITA ET AL.

Examiner

Kenneth J. Ramsey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on June 24, 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-34, 36-38 and 40-47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) all pending claims is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Prior Art Rejections

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 2-8, 11-17, 20-24, 27-41 and 44-47 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Kawade et al (US 6,034,478 or JP 09-298029) in view of Banno et al (JP 62-174840) and Ueno et al (JP 6-12997). Column 11, line 32 through column 12, line 41 (JP Paragraph [0086] through paragraph [0090]) discloses energization forming an electroconductive film in an atmosphere comprising a gas that promotes the cohesion of the electroconductive film while heating the film by resistance. The cohesion promoting gas atmosphere comprises H₂, CO or methane. The electron-emitting devices so formed are provided as an electron source of an image-forming device (figure 8). It is not disclosed that the electroconductive film is preheated between 50°C and 150°C prior to energizing forming. However, the examiner maintains that it would have been obvious for one of ordinary skill in the art to preheat the substrate of Kawade et al prior to energization forming because it was known in the art at the time of applicants' invention that energization forming without preheating results in non-uniform results during energization forming. Thus not only as taught by Banno et al, translation, page 3, line 6 through page 5, line 9, it would have been known to one of ordinary skill in the art that the process of Kawade is desirably carried out after first preheating the substrate to avoid cracking due to thermal shock; but furthermore,

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Banno et al, page 8 of the translation, lines 14-18 states that "according to the present invention [with controlled heating of the substrate], even if the substrate has a plurality of electron emission elements, forming having uniformity and reproducibility can be carried out in the same substrate because the substrate is kept at the same temperature as a whole". For the same reasons, it would have been obvious to one of ordinary skill in the art at the time of applicants' invention to preheat the substrate of Kawade. Of course, one of ordinary skill would not carry out the step of preheating to such a degree that the process becomes unstable. Also, one of ordinary skill would want to balance the costs of heating with the costs of process time along with the possible spoilage of the product. Such considerations are routinely investigated prior to finalization of the process parameters. In this regard Ueno et al, paragraphs 193-194, teaches that with the use of a flowing hydrogen gas at 1 per cent concentration, "without any problem, the device could be formed with an excellent reproductivity" (sic). It is noted that the process of Ueno employed energization forming at a joules heat of 4 J whereas in the "conventional" case of processing in air, a joule heat of 10 J was generated (paragraph 169) and there was cracking of the substrate (paragraph 194). While Ueno et al did not specify preheating, Banno did, and it can be readily seen that heating was required in the process of Ueno also since Ueno taught that processing time for energization forming could be reduced from one minute to a short time of 100 msec. Compare this with applicant's specification which taught that for the step of energization forming, step 3, page 65, line 9 through page 66, line 16, even with twice the amount of hydrogen, the process took 15 minutes with unsatisfactory results if there

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was no heating. Also, the brief description of Fig. 23 of Ueno et al (translation, page 38) indicated that preheating with energization forming was conventional. Thus the prior art clearly taught the claimed process except for the specific heating temperature.

"[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (Claimed process which was performed at a temperature between 40°C and 80°C and an acid concentration between 25% and 70% was held to be prima facie obvious over a reference process which differed from the claims only in that the reference process was performed at a temperature of 100°C and an acid concentration of 10%). Thus, although Banno and Ueno do not specify the preheat temperature, the determination of the optimum amount of preheating required to avoid cracking of the substrate and to obtain satisfactory results without excessive costs would have involve routine shop practice. As to claims 30, 31 and dependent claims, Ueno et al taught that a flowing gas atmosphere in the process of Kawade et al allowed for an excellent reproducibility. Since used of a flowing reducing gas prior to energization and under non-uniform conditions would be a waste of gas and undesirable, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to delay the flow of gas until after the start of preheating. As to claims 11 and 12, Kawade et al form a palladium oxide film, at column 25, lines 1-8. As to claims 32 and 33, since Banno et al, page 8 of the translation, lines 14-18, teaches that it is necessary to have the substrate at a uniform temperature during energization forming to obtain uniform results, it would have been

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obvious to one of ordinary skill in the art to delay energization forming until after the start of preheating.

3. Claims 9, 10, 25, 26, 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawade et al, Ueno et al and Banno et al, as above taken with respect to claim 7, in view of Talko et al (EP patent 769,796). To form the palladium oxide film of Kawade et al by the ink jet droplet method of Talko et al, column 32, lines 30-41, would have been obvious to one of ordinary skill in the art since accurate placement of the film is possible.

Response to Applicants Arguments

4. Applicants argue that since Kawade et al (US 6,034,478 or JP 09-298029) discloses that the lower energization currents enable by conducting the forming in a hydrogen containing atmosphere avoided the problem of cracking of the substrates of the prior art that one of ordinary skill in the art would not have been motivated to employ a preheating step in Kawade et al as taught by Banno because Banno taught a prior process where preheating was necessary to avoid cracking. However, applicants acknowledge that the temperature of processing is critical because the degree of reaction may be too fast to obtain reproducible results or too slow to be cost effective in their prior response. Moreover, the motivation to preheat the substrate as found in the reference to Banno did not merely involve the problems of inducing cracks in the substrate due to sudden change of temperature but further involved the need for uniform heating of the substrate during energization forming to obtain reproducible results. The examiner maintains that in spite of applicants' arguments, Banno clearly

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teaches the need to preheat the substrate to obtain uniform and reproducible results when conducting energization forming. See Banno (at page 8 of the translation, lines 14-18) which teaches that a controlled preheating step was required for simultaneous energization forming of multiple emission elements such as for a field emission display, since otherwise there would be excessive temperature gradients which would result in non-uniform energization forming. Note also that Ueno taught that preheating was conventional and that the process resulted in reproducible, i.e., uniform results. Because Ueno et al used a very dilute hydrogen-nitrogen mixture; it is reasonable to presume that some heating was required to speed the process. Further a lesser amount of heat to prevent cracking of the substrate could be allowed with the use of a hydrogen atmosphere than in prior art processes in a vacuum or air, since a lower joule heat in the energization forming step was possible. It is common knowledge in the art that non-uniform and uncontrolled heating in hydrogen processes, especially high temperatures, leads to unpredictable results. Since higher temperatures may lead to less tolerance for error in the timing of process, as would have been expected by one of ordinary skill in the art, it would have been obvious to preheat the substrate of Kawade et al in accordance with the teachings of Banno et al and Ueno et al at lower temperatures wherein the process could be more easily controlled. The degree of preheating is also partially dependent upon such factors as the amount of joule heat created in the energization process, the thermal conduction properties of the substrate being formed, etc. which factors are predeterminable. Therefore the process as claimed would have been obvious to one of ordinary skill in the art.


Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Directions for Responses

Any inquiry concerning this communication should be directed to Kenneth J. Ramsey at telephone number 703-308-2324.


Kenneth J. Ramsey
Primary Examiner
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